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DUMONTIA FILIFORMIS ON THE NEW ENGLAND COAST.

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In the years 1920 and 1921, Mrs. Setchell and myself attempted to determine something of the algal flora in the vicinity of Newport, Rhode Island, as regards its seasonal periodicity. Collections were planned for each month of the year, but, for reasons of inclement weather coincident with times of extreme low tide intervals, they could not be carried out with the regularity desired. We selected a locality along the outer Beach Road, about half-way between Graves Point and Prices Neck (cf. U. S. C. & G. S., chart No. 353, issue of Mar., 1918). Two jutting points enclosing a small rocky and pebbly beach, at the very roadside, offer here an exceptionally good and convenient collecting place, directly exposed to the waters of the Atlantic Ocean. On the easterly rocky point, composed of a flakey, micaceous schist, the different belts of the littoral region were well represented and, being provided with numerous small, shallow tide-pools, afforded excellent habitats for many small species, especially during the spring and early summer months. Our collections covered the months from March to September, with the exception of August, when inclement weather at the times of favorable low tides interrupted the sequence.

At this locality, the extreme maximum temperature of the ocean waters seldom, if ever, exceeds 20° C., although that of the shallow tide-pools may exceed 30° C. for short intervals of time. The summer

algal flora of the sublittoral belt, therefore, is largely of the type of the northern New England coast in summer and its winter and spring flora may even include spring or summer species normal to Labrador and Greenland coasts. The plants of the tide-pools are numerous in spring and even in early summer, but are few in middle and late summer, since the temperature of the water rises to that typical of the waters of Long Island Sound and those to the south without affording other physical conditions adapted to the growth of species of those regions. The tide-pool algal flora of summer, therefore, consists only of a few perennial species which can endure such higher temperatures in a state of quiescence. It is my intention to publish some detailed notes as to these relations when the collections have been more completely worked over.

One of the interesting and important finds of our collecting was *Dumontia filiformis* (Huds.) Grev., a species, until comparatively recently, unknown from the Atlantic Coast of North America. At Newport it grows in the shallow tide-pools, often filling them completely, and occurs from the latter part of March until the earlier portion of July. By the last week in March the plants were well formed, but no organs of reproduction were found. Presumably these plants were all gametophytes. About the middle of April plants were found with antheridia and young procarpic branches. About the middle of May plants with mature cystocarps were common as were also those with well formed but undivided tetrasporangia. About the middle of June only tetrasporic plants were found and these lasted until the middle of July in 1920, although mostly old and becoming disorganized. In 1921, however, on July 6, no plants were to be seen in the tide-pools, but there had been heavy rains for several days previously, which may have hastened their disappearance.

Dumontia filiformis was first detected on the Atlantic Coast of North America at South Harpswell, Maine, by Grace A. Dunn, in June, 1913, and was collected by Roland Thaxter at Kittery Point, Maine, in the spring months of 1914. Plants collected by Thaxter in May, 1914, were distributed in the Phycotheca Boreali-Americana (Fasc. xliii, No. 2149) in April, 1916. In two copies examined these plants show young (undivided) tetrasporangia. Dunn has presented accounts of the vegetative structure and reproduction of the South Harpswell plants in two papers (Plant World, vol. 19, pp. 271–281, figs. 2, 1916, and Bot. Gaz., vol. 63, pp. 425–467, pl. 19–22, and text fig. 1–7, 1917).

The appearance of this plant, long sought for, on the eastern coast of North America, in such abundance at two localities on the Maine coast suggests, as Dunn has indicated (1917, pp. 425 and 459), that it is a recent introduction. The vicinity of the Harpswell Laboratory had been carefully explored in the early part of July by Frank S. Collins for six seasons (viz., 1902–1905 and 1908–1909) without Dumontia having been detected. Dunn, consequently, suggests that it had become established somewhere between 1909 and 1913. The discovery of *Dumontia filiformis*, well established, on a portion of the New England coast so remote from the Maine coast as Newport, R. I., seems to indicate that it has been much longer in residence on the New England coast, but has been overlooked. In its July state it resembles closely passé plants of *Halosaccion ramentaceum* (L.) Ag., and may have been passed over even by such an experienced collector as Collins as unworthy of closer examination.

Dumontia filiformis, formerly credited with a wide distribution, occurs on the Atlantic coasts of Europe, on the northeast and northwest coasts of North America, and on the northeast coast of Asia. Cotton (Journ. Linn. Soc., Bot., vol. 43, p. 202) has examined the specimens from the Falkland Islands and from the New Zealand region which have been credited to *Dumontia filiformis* and finds that they are all different, even generically. As he says (loc. cit.),—"There is now no evidence that *Dumontia filiformis* occurs at all in the Southern Hemisphere."

On the Atlantic coast of Europe *Dumontia filiformis* ranges from the region of the English Channel to the northern coasts of Norway and thence east to the Murman Sea, but in more northern waters is only occasional and inhabits sheltered localities. Since it grows in shallow tide-pools, the water surrounding it is commonly raised in temperature by insolation. It occurs on the southwest coast of Iceland. It is still a question as to whether it is to be classed as an inhabitant of the west shore of Greenland. The specific identity of the plant of Bering Sea has been called into question by Kjellman (Om Beringh afvets Algflora, p. 30, 1889), but the relationship is very close, if not identical, with *Dumontia filiformis*. The plant of the Kurile Islands, Asia, is similar to that of the Bering Sea coasts of North America.

Since there has seemingly been confusion between *Dumontia filiformis* (Huds.) Grev. and *Halosaccion ramentaceum* (L.) Ag. (cf.

Rosenvinge, Grønlands Havalger, p. 786, 1893), this tendency to confuse the two plants while collecting may explain the unnoted presence of the former species on the coast of New England previous to 1913. The discovery at Newport, R. I., may further indicate that additional localities, both north and south, remain to be discovered. The seasonal behavior indicates the temperatures of 10° C. to 20° C. as those critical for the fruiting of this species, covering both the production of cystocarps and of tetrasporangia and suggesting that 10° C. to 15° C. may be the temperatures favorable for cystocarpic reproduction (gametophyte) and 15° to 20° C. for tetrasporic reproduction (sporophyte).

It is to be noted that *Dumontia filiformis* is credited with possessing a prostrate perennial basal portion (cf. Reinke, Algenfl. westl. Ostsee, p. 204, 1889, and Brebner, Journ. Linn. Soc., vol. 30, pp. 436–443, pl. 35, 36, 1895). Dunn neither makes mention of this in the New England plant nor reference to the various accounts of its significance, persistence, and special structure, although her figures (loc. cit., pl. 19, figs. 8, 9) of the holdfast indicate that her plants possessed a basal portion of more complicated structure than that of an ordinary discoid holdfast. My own specimens show something of this prostrate thallus, but it is desirable that our New England plants be studied more in detail in this respect.

Brebner (loc. cit.) and Oltmanns (Morph. u. Biol. d. Algen, I, p. 573, fig. 356 a, 1904) have given a different interpretation to the structure of the apical meristem of the European plant from that of the American plant as indicated briefly by Dunn (loc. cit., p. 436), but her figure (pl. 19, fig. 11), although taken in all probability from a fairly mature branch, is more consistent with what is indicated for the European *Dumontia filiformis* than the type of apical meristem represented by *Furcellaria fastigiata* (cf. Oltmanns, loc. cit., p. 545, fig. 329).

The points as to identity in structure and development of the plants ascribed to *Dumontia filiformis* of the Atlantic Coast of Europe and North America are not completely settled as yet as I have shown by indicating our lack of knowledge as to details of agreement or difference in connection with the prostrate thallus and the apical meristem. As to the specific identity of the plants of the North Pacific with those of the North Atlantic, the question has been raised by Kjellman (loc. cit.), as indicated previously. There seem possibly

to be differences in details of vegetative structure and in the size of carpospores and tetraspores between the two sets of plants, but examination of a large series of specimens is required to make this certain. This question must remain to be settled in the future.

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LABIATAE.

AGASTACHE.

A. scrophulariaefolia (Willd.) Ktze. Rich woods, Oak Island, Revere (*Wm. Boott*, Aug. 16, 1861; other collectors down to 1908). A rare plant of rich woods, occasional in Berkshire county and Connecticut; this station probably now extinct.

AJUGA.

A. REPTANS L. Escaped on bank, Cambridge (*W. Deane*, June 6, 1910); spontaneous under shrubs in garden, S. Hanover (*Mrs. E. A. Josselyn*, June 17, 1904); reported from moist meadow in N. Easton by C. Blomberg in RHODORA, iv. 14, 1903.

BALLOTA.

B. NIGRA L. Dump, Cambridge (*W. Deane*, Oct. 10, 1885); Hull (*C. E. Perkins*, July 15, 1881); also Chelsea and E. Boston, no data.

[*Blephilia ciliata* Raf. is reported by Dr. Thomas Morong from Ashland, in Dame & Collins, Fl. Middlesex Co., 72, 1888. As this is the only record for this plant in Massachusetts from east of the Connecticut Valley, it is probably a casual introduction, and not a native plant at Ashland.]

COLLINSONIA.

C. canadensis L. Rich woods, rare; Oak Island, Revere, Ipswich, Georgetown, Haverhill, Dracut.

DRACOCEPHALUM.

D. PARVIFLORUM Nutt. Waste places, rare; W. Cambridge (*A. S. Pease*, July 4, 1908); Needham (*T. O. Fuller*, July 10, 1899); S. Hanover (*Mrs. E. A. Josselyn*, June 16, 1899).